



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,778	01/12/2004	Mark A. Lavin	FIS920030323	1777

32074	7590	08/28/2006	EXAMINER
INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 300-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533			ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

✓

Office Action Summary	Application No.	Applicant(s)	
	10/707,778	LAVIN ET AL.	
	Examiner	Art Unit	
	Stephen Rosasco	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/1204, 5/27/04</u> . | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

Claims 1 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims recite the phrase - eliminating detail of the main shapes, which leads to unmanufacturable associated shapes -. The associated shapes can be SRAF's, which by virtue of their subresolution are not displayed in the resulting mask pattern. Therefore, the use of the word unmanufacturable here is unclear, as these shapes are never actually produced in the pattern.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reich et al. (5,900,340) or Winder et al. (6,416,907).

[claims 1-18] The claimed invention is directed to a method of providing associated shapes of an optical lithography mask in relation to predetermined main shapes of the mask.

[claims 19-20] are directed to a recording medium for performing the method recited in claims 1-18.

The applicant discusses the limitations of the prior art in that the algorithm according to the prior art is quick to delete SRAFs upon discovery of mask rule violations.

And preserves only those SRAFs, which do not have mask violations when viewed in relation to the initial main mask shapes. As a result, many a mask edge is often left unassisted by an SRAF, and the process window is consequently diminished.

In the claimed invention in section [0051-0052] a description of the growth and shrink operations are described, which are performed to reduce non-uniformities in the main shapes.

Reich et al. teach (see claims) a method for adding subresolution assist features to a semiconductor design to correct for proximity effects in the semiconductor design comprising the steps of:

A) performing a growing function on a base shape by a first amount to produce a first shape;

B) performing the growing function on the base shape by a second amount to produce a second shape;

C) subtracting the second shape from the first shape to produce the subresolution assist features; and

D) unioning the base shape and the subresolution assist features to form a final shape, wherein the final shape including the subresolution assist features formed adjacent to the base shape.

And wherein within steps (A) and (B): the growing function is an edge-out function that moves each edge of the base shape outward a fixed amount in a direction such that it remains parallel to each original edge of the base shape.

Winder et al. teach a method of creating a phase shift mask, which employs the technique of stretching any phase shape by a first predetermined phase width to form a stretched phase shape;

naming as an x degree phase shape any area of any said stretched phase shape which does not overlap a said phase shape or a said printable shape;

growing each said phase shape by said first predetermined phase width to form a grown phase shape; and

naming as an x degree phase shape any portion of a said grown phase shape which (1) does not overlap a said phase shape or another said x degree phase shape, and (2) is not touching a said printable shape.

And further comprising growing and later shrinking any said x degree phase shape.

The teachings of Reich et al. or Winder et al. differ from those of the applicant in that the applicant teaches preserving a common region between the predetermined main shape and the resulting shape after the growing and shrinking.

However, the occurrence of common regions between the shapes would be an expected result of the growing and shrinking steps as space will be created.

Therefore, it would have been obvious to one having ordinary skill in the art to take the teachings of Reich et al. or Winder et al. and maintain the common regions between the predetermined main shape and the resulting shape after the growing and shrinking in order to make the claimed invention because one would expect that this would result and would allow for greater flexibility with the shape manipulations.

Art Unit: 1756

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, elongated flourish extending to the right.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
08/18/06